



# Environmental Technology Partnerships

Environmental  
Cleanup

U.S. Environmental  
Protection  
Agency

Office of Research and Development  
Washington, DC 20460

EPA/600/F-94/037  
September 1994

*Item 431-J-15*

## Cooperative Research and Development Agreement With the Shell Oil Company

### *Design, Operation and Monitoring of In Situ Soil Vapor Extraction Systems*

#### Participants

This Cooperative Research and Development Agreement (CRADA) brought together scientists and engineers from the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Underground Storage Tanks (OUST); the Office of Research and Development (ORD), Office of Environmental Engineering and Technology Demonstration, Risk Reduction Engineering Laboratory; and the Shell Oil Company's Development Corporation.

#### Purpose

The purpose of this project was to advance the use of soil vapor extraction systems for cleaning up leaking underground gasoline storage tank sites with decision support software through field-testing and refinement of vacuum extraction algorithms and decision criteria proposed by Shell Development Corporation at Shell sites.

#### Background and Results

EPA's OUST has as a program goal the swift, efficient remediation of gasoline releases from underground storage tanks. To assist in this goal, OUST is working with associated state programs to identify and minimize technical and procedural inefficiencies in their corrective action efforts.

The Shell Development Corporation has developed a software system(HyperVentilate) that outlines decision steps and criteria for determining whether soil vapor extraction (SVE) is feasible. This CRADA verified the design phase of the venting model and further evaluated Shell's procedure for designing, operating and monitoring soil venting systems. New procedures and processes were developed to display the information and evaluate the applicability of SVE systems for specific sites.

A Quality Assurance Project Plan (QAPP) was developed, which details all requisite data collection methods, quality assurance/quality control procedures, and field inspection requirements.

The assessment and decision steps, as outlined, were incorporated into electronic format. This software package enables a speedy assessment of the feasibility of using the

SVE system to provide design recommendations (e.g., flow rates and well spacing) for its most effective vapor recovery rates and cleanup levels.

#### Benefits to Government and Industry

The applicability of Shell's SVE system implementation approach and its associated QAPP and decision support software were evaluated and subsequently distributed to all states, EPA Regions, and other interested parties.

This is one of more than 50 cooperative research and development agreements EPA has with various U.S. businesses, academic institutions and state and local governments under the the Federal Technology Transfer Act of 1986. These agreements serve as a mechanism for the federal government to work with private industry and others to develop new pollution prevention and control technologies and efficiently bring them into the marketplace.

#### Contacts

##### Chi-Yuan Fan

U.S. Environmental Protection Agency  
Office of Research and Development  
Risk Reduction Engineering Laboratory  
2890 Woodbridge Avenue/MS-104  
Edison, NJ 08837  
Phone: (908) 906-6924  
FAX: (908) 321-6640

##### Dr. Paul Johnson

Shell Oil Company  
Shell Development  
Westhollow Research Center  
P.O. Box 1380  
Houston, TX 77251-1380

##### Jane E. Ice

Technology Transfer Specialist  
U.S. EPA/ORD  
Office of Science, Planning and Regulatory Evaluation  
26 West Martin Luther King Drive  
Cincinnati, OH 45268  
Phone: (513) 569-7311  
FAX: (513) 569-7132



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